Statement of Dr. Yiban Xu

This affidavit is being supplied to state that if called upon, I, Yiban Xu would be competent to confirm as to the accuracy of the following in relation to the experiments on bubble (sono) fusion that I have conducted or participated in:

1. I am making this statement of my own personal knowledge and of my own free will. All of the facts contained in this statement are true.
2. I obtained my PhD in Nuclear Engineering from Purdue University in 2004.
3. The bubble fusion test cell apparatus used for my independent confirmatory studies (Xu et al., 2005) was based on the teachings and design information of the invention document entitled "Methods and Apparatus to Induce D-D and D-T Reactions – Co-Inventors: Rusi P. Taleyarkhan and Colin D. West; US Patent and Trademark Office (USPTO) Application 10/692,755, Filing Date Oct. 27, 2003, Pub.Date: Jun.23, 2005" also used by the Taleyarkhan et al. team as reported in their published papers (Taleyarkhan et al., 2002; Taleyarkhan et al., 2004; Taleyarkhan et al.; 2006).
4. There was no intentional effort to dissolve gases into the test liquid prior to conducting bubble fusion experiments but degassing was conducted per teachings of USPTO 10,692,755.
5. Control experiments were systematically conducted changing only one parameter at a time. This was done to ensure that thermonuclear bubble fusion signals (neutrons and/or tritium) were generated only when the test liquid was deuterated, and when it was undergoing nuclear particle based cavitation with spherically imploding bubble clusters per teachings of USPTO 10,692,755 (Fig.3), all else remaining the same.
6. The well-known required signs of thermonuclear fusion (Gross, 1984) were reproducibly obtained, peer reviewed, and recorded as published in my studies. These included: emission of neutrons of ~2.45 MeV with over 11 standard deviation (SD) statistical significance as shown in Fig. 1a. The appropriateness of the measured spectral shape for my experiments as representing 2.45 MeV neutrons from nuclear fusion was also separately confirmed (Fig. 1b) with a 3-D Monte-Carlo based simulation of my experimental system using well-known and established US-federally sponsored computer codes (MCNP, 2003; Dickens, 1998) together with an independent method based on combination of the well-known MCNP code system with the actually measured and published neutron spectra for my detector type (Lee-Lee, 1998). These results are commensurate with teachings of USPTO 10/692,755 (Fig. 11).

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7. My experiments also examined for tritium as would be emitted from nuclear fusion, and it was found that the neutron emissions of para. 6 above, were reproducibly accompanied with commensurate emission of tritium with over 4 SD statistical significance (Fig. 2) when bubble implosions were spherical (Fig. 3a) versus elongated in the form of streamers (see Fig. 3b), when such fusion does not occur. When the bubble implosions were spherical (Fig. 3a) they are audible and recordable shock traces which are also accompanied with emission of light flashes (Fig. 4a) thereby, indicating hot, highly compressed conditions for my experiments as would be the case for thermonuclear fusion. Positive nuclear emissions from my experiments indicative of thermonuclear fusion were obtained reproducibly on several different days and also on within the same experimental campaign on a given day. These results are commensurate with teachings of USPTO 10/692,755 (Figs. 3, 10, 11, and 12).
8. Production of neutrons as byproducts of this method and process have significant potential utility, e.g., for interrogation of materials for non-destructive examination of molecular compounds as at airports and cement industries, for radiation therapy, for diagnosis. The same is true for tritium, a special nuclear material of significance not only for the commonly attributed use for maintaining the nuclear stockpile but more so for wide variety of industrial applications as use in airport runway lights, non-electricity based passive lighting, use as a radio-tracer and taggant for molecules in molecular biology research. The utility aspects of a neutron-tritium source are well established (see, e.g., Waltar, 2004).
9. This method of inducing D-D and D-T reactions is furthermore, distinct in that there was no acoustic horn or such vibrator that was dipped into the test liquid during conduct of my reported bubble fusion experiments. In my bubble fusion experiments of the type reported by Taleyarkhan et al. the nucleation of bubbles occurs away from solid-liquid interfaces. Acoustic energy was provided into the test liquid by use of a piezo-electric element epoxied to the outside of the glass wall.
10. In the experiments that I was involved, care was taken to ensure that there were no extraneous sources of nuclear particles that could have given rise to the bubble fusion signatures as reported for my experiments and studies (Xu et al., 2005).
11. The pressure distribution of the bubble fusion test cell (as used for my studies based on teachings of USPTO 10/692,755 produces neutron sensitive cavitation regions away from the solid-liquid interfaces. This is due to the pressure profiles which ensure that bubble nucleation takes place within the bulk of the liquid once the input power is increased above a certain level readily determined experimentally. This attribute is a

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consequence of the pressure profiles in such a design which is an aspect that I have confirmed for myself while conducting oscillating pressure mapping tests also.

12. It is a well-known fact (Gross, 1984) that conditions for D-D fusion subsume conditions for D-T fusion which are ~100 times easier to initiate.

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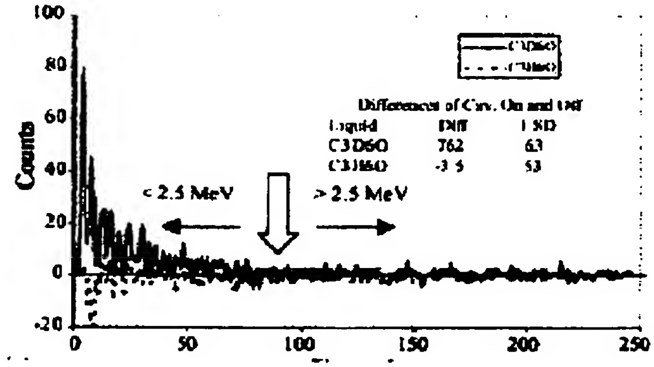

Fig. 1a: Statistically significant (over 11 standard deviations) 2.45 MeV excess neutrons from thermonuclear fusion with neutron seeded cavitation of deuterated acetone(C3D6O) and null results from control experiments with non-deuterated acetone (C3H6O) under identical conditions; confirms teachings of USPTO 10,697,755 (Fig. 11). Fig.1a is excerpted from Xu et al. (2005, *Nuclear Engineering and Design* Journal);

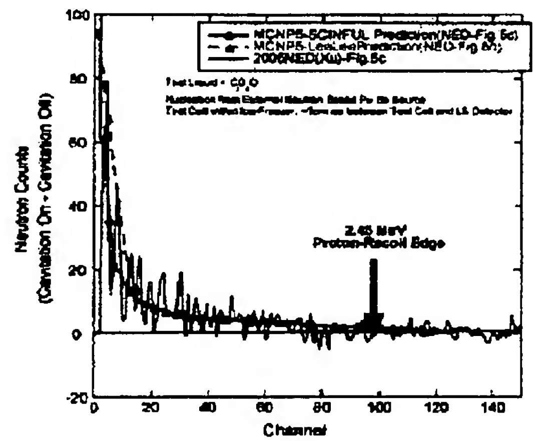

Fig.1b: Independent Numerical Affirmation of D-D Fusion 2.45 MeV neutron spectra with 3-D Monte-Carlo Computer Model simulations of Xu et. al. (2005) experiment using two independent approaches: MCNP-SCINFUL USDoE codes (Dickens, 1988; MCNP, 2003) and MCNP-LeeLee (1998) Measured NE-213 detector Predictions.

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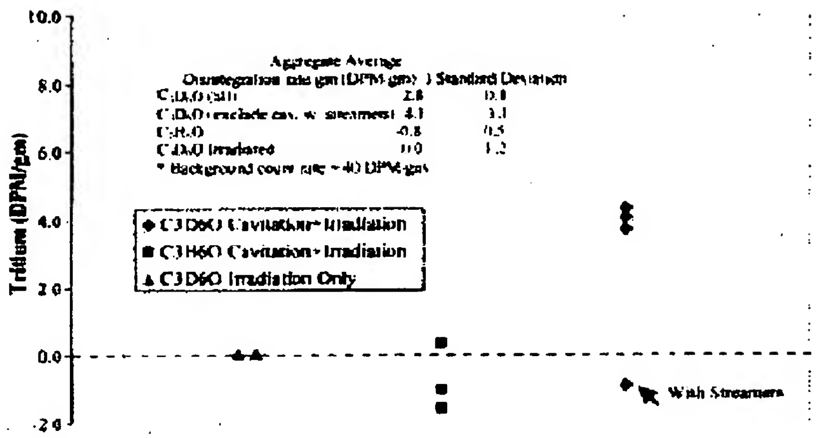

Fig. 2: Statistically significant (4 standard deviations), Reproducible, D-D nuclear fusion based tritium emission with neutron seeded cavitation of deuterated acetone with spherical imploding bubble clusters and null results for all other control experiments commensurate with teachings of USPTO 10,692,755 (Fig.10); Null results are also noted with C3D6O when bubble shapes are non-spherical (streamers); Fig.2 excerpted from Xu et al. (2005).

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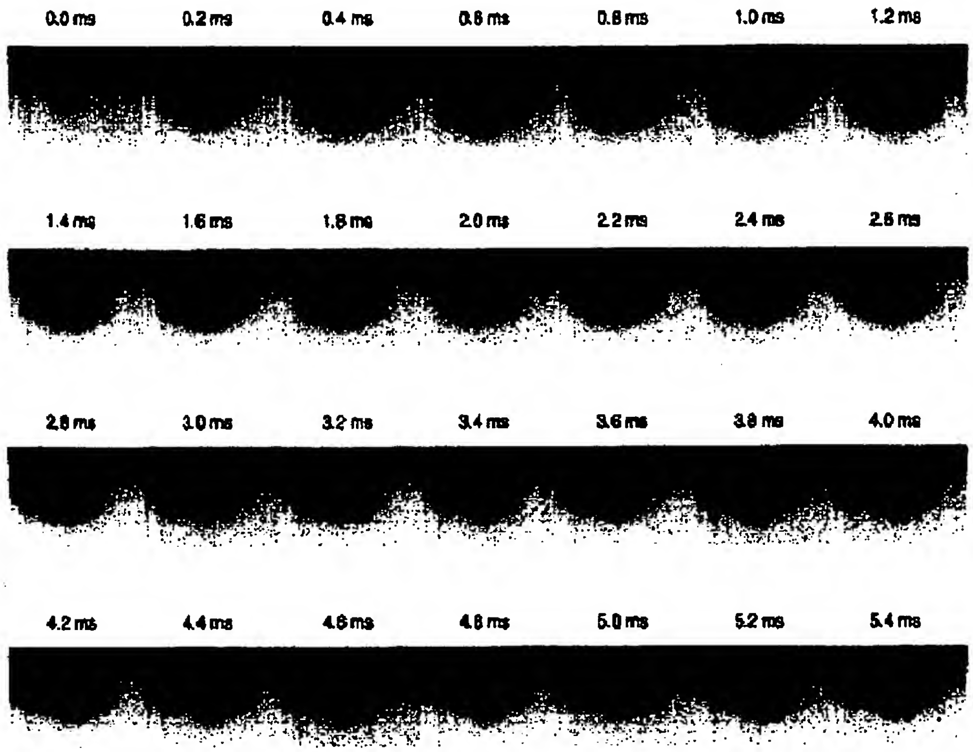

Fig. 3a: Spherical bubble cluster shapes for successful bubble fusion experiments commensurate with teachings of USPTO application 10,692,755 (Fig. 3); Fig.3a excerpted from Xu et al. (2005; *Nuclear Engineering and Design Journal*; Nuclear Reactor Thermal Hydraulics Conference, NURETH-11, 2005).

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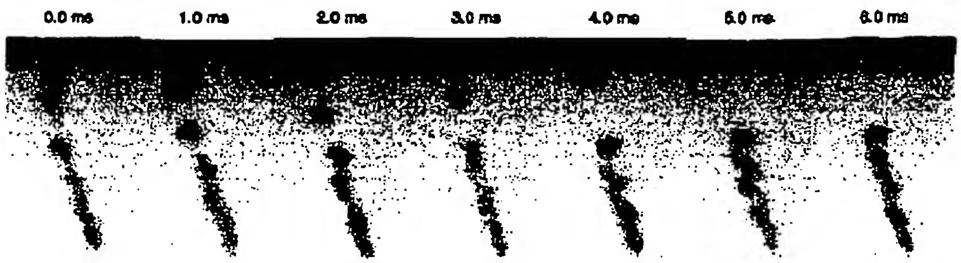

Fig. 3b: Non-Spherical elongated bubble cluster shapes resulting in unsuccessful bubble fusion experiments; Fig. 3b is excerpted from Xu et al. (2005; *Nuclear Engineering and Design* Journal, 2005; Proc. Intl. Nuclear Reactor Thermal Hydraulics Conference, NURETH-11, 2005)

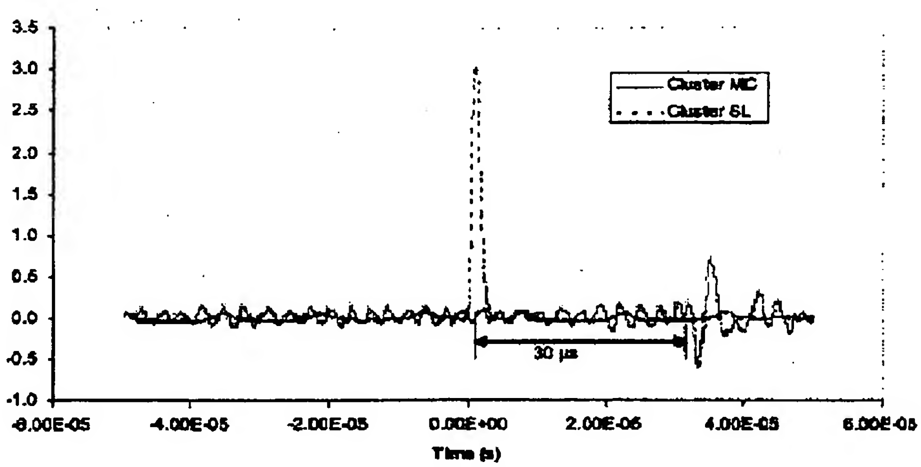

Fig. 4a: SL light flashes for spherically imploding bubbles followed by shock wave 30 µs later for spherically imploding bubbles commensurate with teachings of USPTO 10,692,755 (Fig. 3); Fig.4a is excerpted from Xu et al. (2005, NURETH-11).

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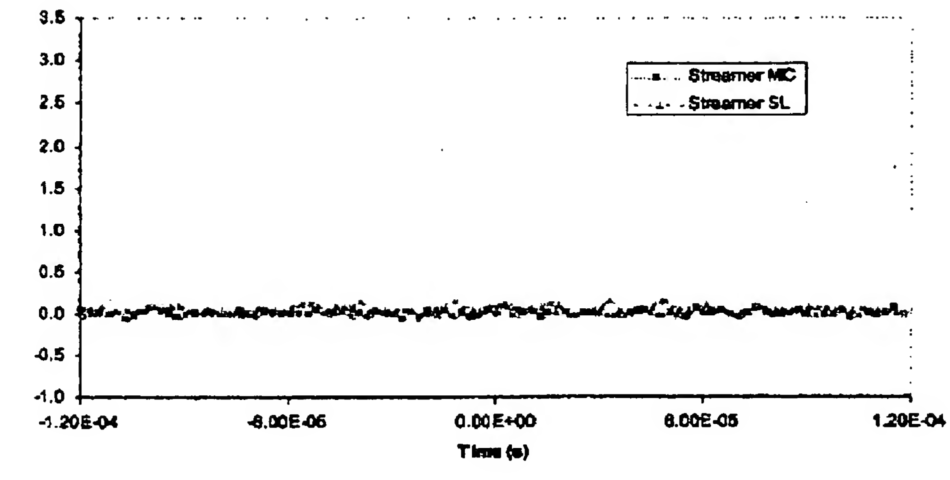

Fig. 4b: Absence of SL light flashes and shock signals for non-spherically imploding bubbles leading to unsuccessful bubble fusion, per USPTO 10,692,755; Fig. 4b is excerpted from Xu et al. (2005, NURETH-11).

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